REMARKS

The present application includes pending claims 1-8. Claims 3-7 stand rejected under 35 U.S.C. 112, second paragraph, as being indefinite. Claim 1-7 stand rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent No. 6,054,061 ("Bayes") in view of United States Patent No. 6,106,899 ("Nakagawa") and U.S. Patent No. 5,447,619 ("Wolski"). Claim 8 stands rejected under 35 U.S.C. 103(a) as being unpatentable over Bayes in view of Nakagawa and Wolski, and further in view of United States Patent No. 5,962,190 ("McKeever"). Claims 1-7 stand provisionally rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claims 1-2 and 5 of co-pending Application No. 10/028,955 in view of Nakagawa and Wolski. Applicants respectfully traverse these rejections at least for the reasons set forth below.

For ease of reference, Applicants have organized the following response by the numbered paragraphs appearing in the June 1, 2005 Office Action.

Paragraphs 2 and 3 – 35 U.S.C. §112, Second Paragraph (Indefiniteness)

Claims 3-7 stand rejected under 35 U.S.C. 112, second paragraph, as being indefinite. The only basis given for this rejection is that in step (b) of claim 3, the phrase "the metal surface" is indefinite because it is unclear whether the phrase refers to the metal surface before or after contacting with the adhesion promoting composition. Applicants submit that it is implicit or inherent in claim 3 that the phrase in step (b) refers to the metal surface after contact with the adhesion promoting composition. Nonetheless, Applicants have amended claim 3 to clarify that the metal surface referred

to in element (b) is that which has been contacted with the adhesion promoting composition. Applicants submit that claim 3 (as amended), as well as claims 4-7 which depend from claim 3, are not indefinite. Applicants therefore respectfully request withdrawal of this rejection.

Paragraph 6 – 35 U.S.C. §103(a) (Obviousness)
Bayes in View of Nakagawa and Wolski

Claims 1-7 stand rejected under 35 U.S.C. 103(a) as being unpatentable over Bayes in view of Nakagawa and Wolski. Applicants' claims employ an adhesion promoting composition which contains the unique combination of an oxidizer (which may be hydrogen peroxide), a pH adjuster or acid (which may be sulfuric acid), a topography modifier (which may be benzotriazole), and a coating promoter (a particular five-membered aromatic fused N heterocyclic compound). Bayes is described as teaching the use of an adhesion promoting composition including hydrogen peroxide, sulfuric acid, and benzotriazole. Bayes is acknowledged to be distinct from Applicants' claimed subject matter in that it does not teach that a coating promoter may be used in the composition. The Nakagawa reference is cited to supply the missing coating promoter.

In particular, Nakagawa is described as using a derivative of aminotriazole or aminotriazole derivatives, "which resembles the claimed coating promoter." Applicants respectfully disagree with the conclusion that the aminotriazole derivatives disclosed in Nakagawa resemble Applicants' claimed coating promoter. Applicants describe the coating promoter of the present Application as a five membered aromatic fused N-heterocyclic ring compound with 1 to 3 nitrogen atoms in the fused ring, wherein none of the 1 to 3 nitrogen atoms in the fused ring are bonded to a hydrogen atom.

(Application, page 11.) Alternatively, Applicants list examples of suitable coating promoters, all of which are five membered aromatic fused N-heterocyclic ring compounds. (Page 11.)

None of the aminotriazole derivatives disclosed in Nakagawa is a five membered aromatic fused N-heterocyclic compound. The only such compound mentioned in Nakagawa appears in the comparative examples. Comparative examples 3 and 7 employ benzotriazole, which is a five membered aromatic fused N-heterocyclic compound. Notably, however, benzotriazole is ***not*** a coating promoter as described in the present Application. In any case, these comparative examples are described as unsuccessful in Nakagawa. *See* Tables 1 and 2 in Nakagawa, which rate comparative examples 3 and 7 as "XX" for the inter-layer peel test. The designation "XX" denotes "very much lifting," i.e. poor adhesion. *See* col. 5 lines 1-3. Thus, Nakagawa does not teach, and certainly does not encourage, the use of a coating promoter according to the present Application.

In any event, Bayes cannot be properly combined with Nakagawa because the references are directed to two completely different aspects of multilayer printed circuit board (PCB) manufacture. Bayes has a purpose similar to the Applicants' invention, a composition that modifies a copper surface to improve its adhesiveness to other surfaces. The surface roughening bath of Bayes modifies a metal surface through both oxidation (using an oxidizer such as hydrogen peroxide) and etching (using a pH adjuster such as sulfuric acid) mechanisms that chemically alter and transform the metal to increase its surface area.

Nakagawa, on the other hand, is directed to an aqueous surface ***coating*** process that neither etches nor oxidizes the metal surface:

> The above objective is achieved in the present invention, by a method of treating a copper surface . . . which comprises ***coating*** the copper surface with an aqueous solution containing at least 0.05% . . . of aminotetrazole or a derivative thereof . . . or with an aqueous solution containing at least 0.05% of aminotetrazole or a derivative thereof [and] at least 0.1% of aminotriazole or a derivative thereof . . . .

col. 2, lines 7-11 (emphasis added). Notably, while Nakagawa explains that several other compounds can be added to the aqueous solution ("water-soluble solvents, nonionic surfactants, metallic salts, or ammonia," col. 3, lines 64-66), nowhere does Nakagawa teach that a pH adjuster such as that disclosed in Bayes (sulfuric or phosphoric acid) or an oxidizer such as that disclosed in Bayes (hydrogen peroxide) can or should be added to the solution. Thus, even if Nakagawa disclosed the use of a coating promoter (which it does not), there is no reason for a skilled artisan to combine its teachings with that of Bayes. For the same reason, the uniformity enhancer which is missing from Bayes (see Applicants' claims 2 and 4) cannot be supplied through a combination of Bayes and Nakagawa.

Application claims 1 and 2 are also distinct from Bayes (as described in the Office Action) in that they include the step of cleaning a copper surface with a highly built alkaline cleaning solution. The Wolski reference is cited to supply this missing step. In particular, Wolski is described as teaching "that copper surface is cleaned by soaking alkaline cleaning solution for removing stainproof layer from the copper surface in order to have a cleaner surface."

Applicants submit that Wolski does not teach the use of a highly built alkaline cleaning solution to clean a copper surface. The text of Wolski that is cited in the Office

Action merely states that "removal of the stainproof layer . . . is accomplished by either chemical (alkaline soaking followed by acid soaking) cleaning, or mechanical cleaning . . . ." (Col. 10 lines 7-9.) The Office Action provides no evidence that "alkaline soaking followed by acid soaking" is the same as applying a "highly built alkaline cleaning solution." Indeed, the present specification describes a highly built alkaline cleaning solution as comprising a surfactant and a phosphate or a phosphate ester. (Application, page 13.) Wolski makes no mention of the use of surfactants or phosphates. Because the Office Action fails to explain how the basic/acidic soaking steps described in Wolski renders obvious to one of ordinary skill in the art the Applicants' claimed use of a "highly built alkaline cleaning solution," Applicants request that this rejection be withdrawn.

Paragraph 7 – 35 U.S.C. §103(a) (Obviousness)
Bayes in View of Nakagawa, Wolski and McKeever

Claim 8 stands rejected under 35 U.S.C. 103(a) as being unpatentable over Bayes in view of Nakagawa and Wolski, and further in view of McKeever. Specifically, the Office Action acknowledges that Bayes fails to teach an adhesion promoting composition which includes 1-hydroxybenzotriazole, and so the McKeever reference is cited to supply the missing compound.

Applicants have already explained why Bayes cannot be properly combined with Nakagawa (and why Nakagawa does not, in any event, teach the use of the claimed coating promoters), and why Wolski does not teach the claimed cleaning step. Applicants further submit that Bayes cannot be properly combined with McKeever because, as with Nakagawa, the references are directed to two completely different aspects of multilayer PCB manufacture.

Bayes is directed to a composition that is applied to a metal surface by way of a bath or a spray, which operates to "increase its surface roughness for subsequent adhesion to a polymer layer." (Bayes, Abstract and Col. 6, lines 28-31). McKeever, on the other hand, is directed to a **photopolymerizable film** that is typically used as a protective photoresist layer during the PCB manufacturing process. In particular, McKeever is directed to polymerizable compositions which are used

> to form a photoresist (or resist) layer on a substrate, such as copper clad glass epoxy, to allow subsequent selective processing of the substrate [or] to form a permanent solder mask layer on an imaged substrate to protect the underlying circuit lines from solder exposure . . . .

(Col. 1, lines 14-21.) In other words, Bayes teaches a composition which ***modifies a metal surface to improve adhesion***, whereas McKeever is directed to polymeric film compositions which are applied to a metal surface to function as a photoresist and to protect the surface or portions of the surface. There is no teaching in McKeever to suggest that the polymeric compositions ***modify*** a metal surface to improve adhesion. Nor is there any teaching in McKeever that the polymerizable compositions are somehow themselves used to improve adhesion between a metal surface and another surface.

Furthermore, because the compositions of McKeever are used to ***protect*** the substrate rather than to modify it, the reference actually teaches away from combination with the surface modification composition of Bayes. In other words, McKeever suggests that the components of its polymeric coating compositions – which tend to be protective and do not modify the surface of the substrate – would ***not*** be a useful addition to the surface roughening bath of Bayes, which does purposefully modify the metal surface. For the foregoing reasons, applicants submit that Bayes is not properly combinable with

McKeever. Applicants thus respectfully request that the rejection of claim 8 as obvious over Bayes in view of Nakagawa, Wolski and McKeever be withdrawn.

Paragraph 9 – Obviousness-Type Double Patenting
Claims of Co-Pending Application in View of Nakagawa and Wolski

Claims 1-7 stand provisionally rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claims 1-2 and 5 of co-pending Application No. 10/028,955 in view of Nakagawa and Wolski. Claims 1-2 and 5 of the co-pending application are described as differing from the instant Application in that they do not employ an adhesion promoting composition that includes a coating promoter and also in that they do not contain a step for applying a highly built alkaline cleaning solution.

Nakagawa and Wolski are cited to supply the missing coating promoter and cleaning solution, respectively. As Applicants have explained above, however, Nakagawa is directed to a completely different aspect of PCB manufacture and does not, in any event, disclose any of the presently claimed coating promoters. In addition, Wolski does not disclose the presently claimed cleaning solution. For these same reasons, Applicants submit that Nakagawa and Wolski cannot be combined with the claims of the '955 application to arrive at Applicants' presently claimed subject matter. Thus, Applicants respectfully request withdrawal of the provisional rejection under the doctrine of obviousness-type double patenting.

CONCLUSION

Applicants have shown that this application satisfies all the legal requirements pointed out by the Examiner. Therefore, the Examiner is respectfully requested to prepare a Notice of Allowability allowing all the pending claims 1-8.

If the Examiner has any questions or the Applicants can be of any assistance, the Examiner is invited and encouraged to contact the undersigned at the number listed below. The Commissioner is authorized to charge any necessary fees or credit any overpayment to the Deposit Account of McAndrews, Held & Malloy, Account No. 13-0017.

Respectfully submitted,

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